ONTARIO PARKS

Killbear

Vegetation Stewardship Plan

Ontario

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APPROVAL STATEMENT

I am pleased to provide approval for the **Killbear Vegetation Stewardship Plan**. This plan has been developed to meet the commitment of the Killbear Provincial Park Management Plan (2000) to prepare a vegetation stewardship plan for the park. It also has been developed in accordance with A Class Environmental Assessment for Provincial Parks and Conservation Reserves (2005). This document recommends specific management techniques and provides guidelines for the vegetation issues facing park managers.

The plan will be reviewed periodically to address changing issues or conditions and advances in vegetation stewardship practices.

I extend my sincere thanks to all those who participated in the public consultation process. All comments received were carefully considered during the preparation of this document.

Yours truly,

B C Pfrimmer — Nov 28, 2005

Brian Pfrimmer, Zone Manager
Central Zone, Ontario Parks

Date

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1.0 INTRODUCTION

1.1 Location and Site Description

Killbear Provincial Park is located 13 km west of Parry Sound on the east coast of Georgian Bay (Figure 1). This Natural Environment class park includes 1133 ha of land and 623 ha of water. Activities include camping, swimming, biking, picnicking, wildlife viewing and hiking. A map of the park boundary and zoning is shown in Figure 2 in the Killbear Provincial Park Management Plan (MNR 2000). Note that approximately 150 ha of land adjacent to the west boundary of the park is proposed for addition to Killbear.

The park is in Ecodistrict 5E-7, which has an area of approximately 550,000 ha extending from the French River on the north to the Severn River on the south and westward across Georgian Bay (Brunton 1993). A sloping plain of granitic bedrock ridges in Site District 5E-8 forms its eastern boundary. Brunton (1993) added that the site district is characterized by vast bedrock barrens and associated open upland coniferous and deciduous forests, especially in the vicinity of the Georgian Bay shore. This resulted from severe erosional activity during the Wisconsin glaciation and subsequent submergence by Lake Nipissing and Lake Algonquin. The relatively recent emergence of the area results in the youngest upland landscape in Site Region 5E. The soils of the ecodistrict consist of a shallow veneer of acidic to neutral silts and sands overlying bedrock with occasional deep, sandy, glaciofluvial deposits (Hills 1959).

The soils of Killbear have been described by Kershaw (1997) as follows. The park's shoreline is typical of Ecodistrict 5E-7, varying from gently sloping sandy beaches and wave polished bedrock to steep, jagged rock cliffs. Over 50% of Killbear consists of exposed wave-washed bedrock and shallow till over bedrock. Regosolic soils are restricted to the sandy beach deposits in Kilcoursie Bay, the easily eroded shallow dune deposits south of Harold Point and the sandy deposits of Blind Bay, Granite Saddle and Lighthouse campgrounds. Well-developed brunisolic and weak luvisolic profiles have developed under the Sugar Maple-American Beech forests. Podzolic soils are associated with the Eastern White Pine and Eastern Hemlock forests. Well-drained, sandy, brunisolic soils have developed on the broken talus and cliffs that support upland Eastern Hemlock and Eastern White Pine forests. Poorly-drained, stone-free gleysolic silts and sandy soils have developed in lowland Eastern Hemlock-Yellow Birch and Black Ash hardwood communities where the underlying bedrock supports pockets of relatively thin soils.

The results of a life science inventory for Killbear (Kershaw 1997) and reconnaissance level work by the author in 2003 indicate that 435 taxa of vascular plants have been reported from the park (Appendix 1). None of the plants are Species at Risk, as designated by the Committee on the Status of

FIGURE 1 **REGIONAL LOCATION OF KILLBEAR PROVINCIAL PARK**

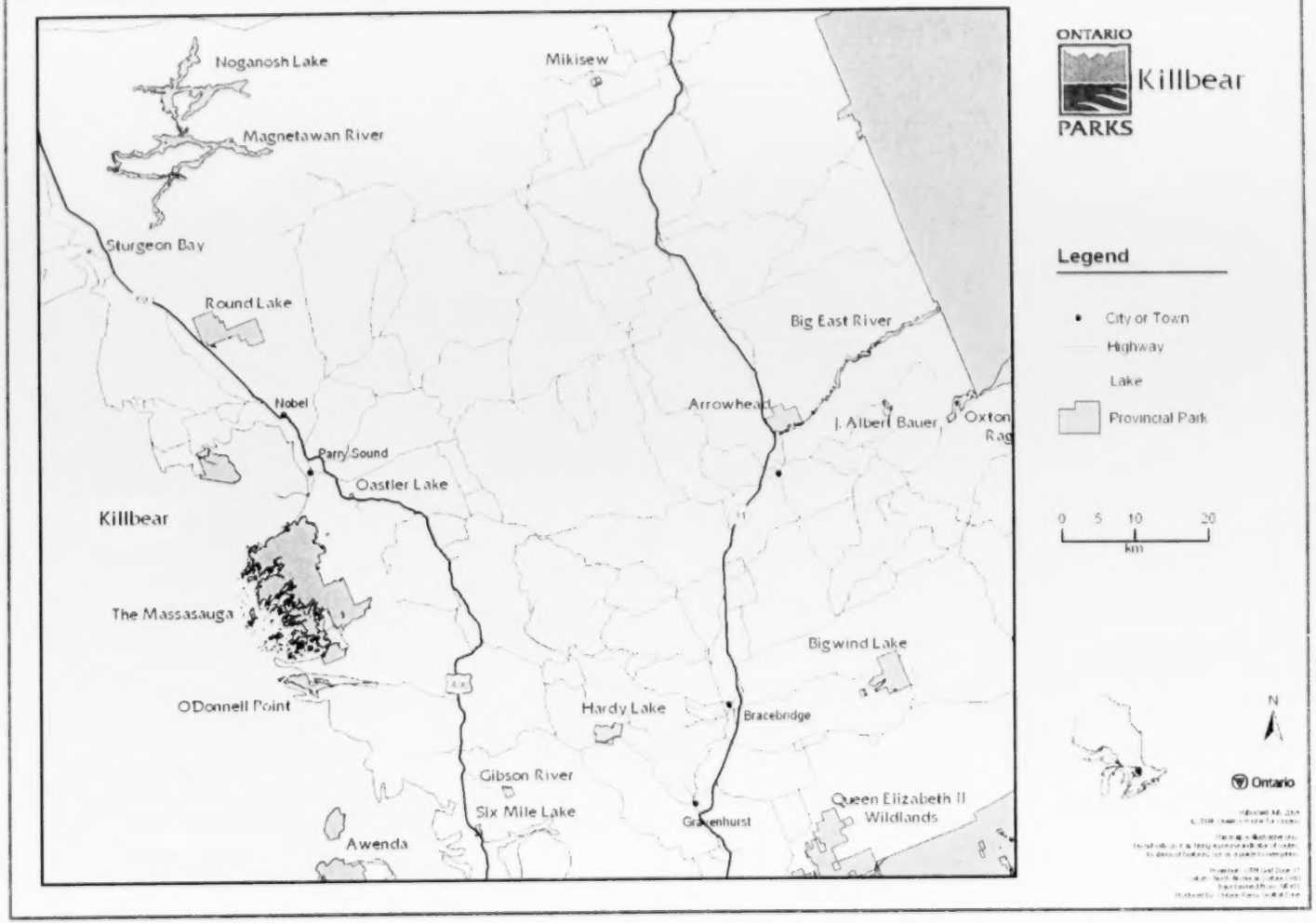
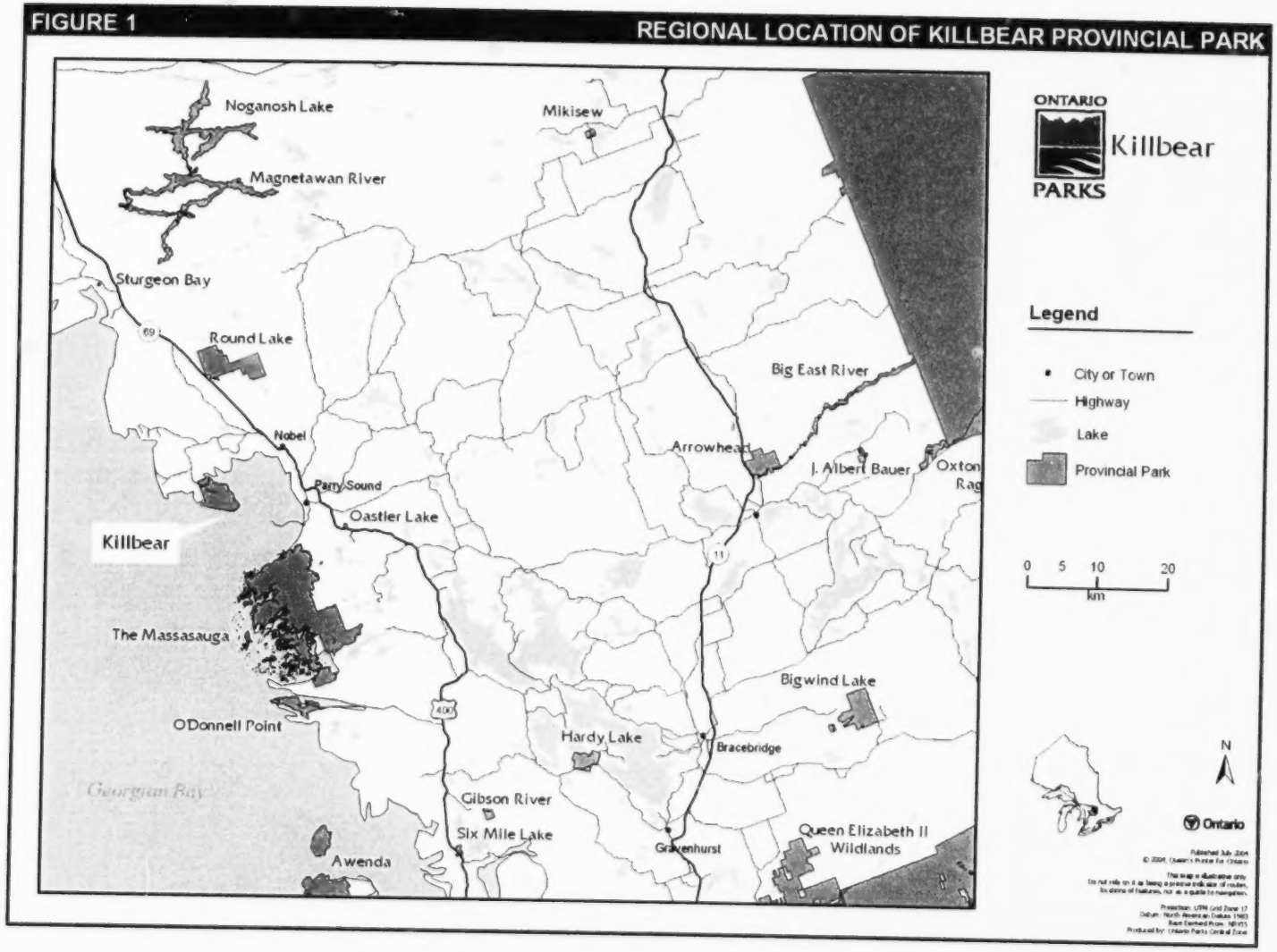


FIGURE 1 REGIONAL LOCATION OF KILLBEAR PROVINCIAL PARK



Endangered Wildlife in Canada (COSEWIC) or the Ontario Ministry of Natural Resources (MNR) but the list does include 13 provincially significant (i.e., rare) taxa. Just over 13% (58 taxa) of the park's flora is non-native and 4% (18 taxa) are considered to be invasive.

The vegetation communities in most of the upland areas in the park have not been dramatically altered by human activities, at least not recently. Trampling of vegetation, soil compaction and erosion and removal of woody debris for campfires have negatively impacted much of the native forest understorey in the campgrounds and along some beaches.

1.2 Policy Framework

This plan has been developed in accordance with A Class Environmental Assessment for Provincial Parks and Conservation Reserves (MNR 2005) and was screened to a Category B project.

This plan has been developed in fulfillment of the vegetation resource stewardship objectives listed in Section 8.1.4 of the Kiilbear Provincial Park Management Plan (MNR 2000). These objectives are to provide specific prescriptions to address vegetation stewardship needs in all of the park's zones; as well as outlining how the impacts of vegetation stewardship activities will be monitored and evaluated.

With respect to deer browse management research (Section 1.4), the park plan states that if a consistent program of management, monitoring, evaluation and reporting cannot be maintained, or becomes redundant, this research will be discontinued. Since there is no longer any active research into deer browse management (i.e., there are no research permit applications on file at the Central Zone office) the plots will no longer be maintained for this purpose. Maintaining browse plots as part of a broader deer management program will also be discontinued for the following reasons:

- habitat manipulation for the presumed, exclusive benefit of a single, common species is inconsistent with the park's overall protection objective
- the resources required to maintain this program could be better used to manage habitat for species at risk
- the negative impacts of browse management (e.g., site disturbance and increased potential for invasion by non-native species) have apparently not been fully considered

Trail maintenance may continue until the supplemental winter feed program is gradually phased out as recommended in the management plan.

The park management plan also states that "a program of under-planting using native trees and shrubs will be undertaken in campgrounds/day-use areas that exhibit significant wear and tear." An aggressive, long-term public information

program may help to educate campers about the importance of protecting native vegetation and should be coordinated with the planting program.

Killbear staff have occasionally been asked to manipulate vegetation to benefit (e.g., improve views of Georgian Bay) landowners with property adjacent to the park. It is the policy of park management that vegetation will not be influenced or controlled for this purpose.

1.3 Goals of Vegetation Stewardship

The goal of vegetation stewardship in the park is to ensure the protection and perpetuation of the full diversity of naturally occurring vegetation communities and the processes associated with their development and maintenance. This goal will be achieved through various maintenance and restoration management techniques.

The specific objectives of vegetation stewardship are:

- to conserve, or restore if necessary, viable communities of indigenous plants with an emphasis on provincially significant species and communities, and to allow their natural succession
- to restore or enhance natural vegetation features and processes that have been, or are in danger of being, lost or degraded
- to eliminate or reduce the presence of non-native invasive species where feasible
- to provide opportunities for park visitors to learn about and appreciate the park's native vegetation communities and their stewardship in ways that do not threaten their natural values
- to maintain and improve habitat suitable for indigenous fauna, especially species at risk occurring at Killbear (e.g., Eastern Massasauga and Eastern Foxsnake)

To meet these objectives more efficiently, it will sometimes be necessary to adopt an active management approach to counter the legacy of human impacts and facilitate the restoration of natural processes.

1.4 Past and Present Influences on Vegetation Communities

In the 1890s a fire burned over much of present day Killbear Provincial Park. Most of the park's forests are approximately 90 years old due to the fires and extensive logging activity which took place around the turn of the 20th century. Between 1915 and 1945 a small maple syrup and logging operation was based at some cabins built along the Blind Bay road (Figure 2). The sugar bush operation continues to be used as part of the park's interpretive program. Except for sap extraction and occasional removal of hazard trees, there has been little impact on or manipulation of the local vegetation community in this area over the past 60 years.

FIGURE 2 **VEGETATION STEWARDSHIP SITES**

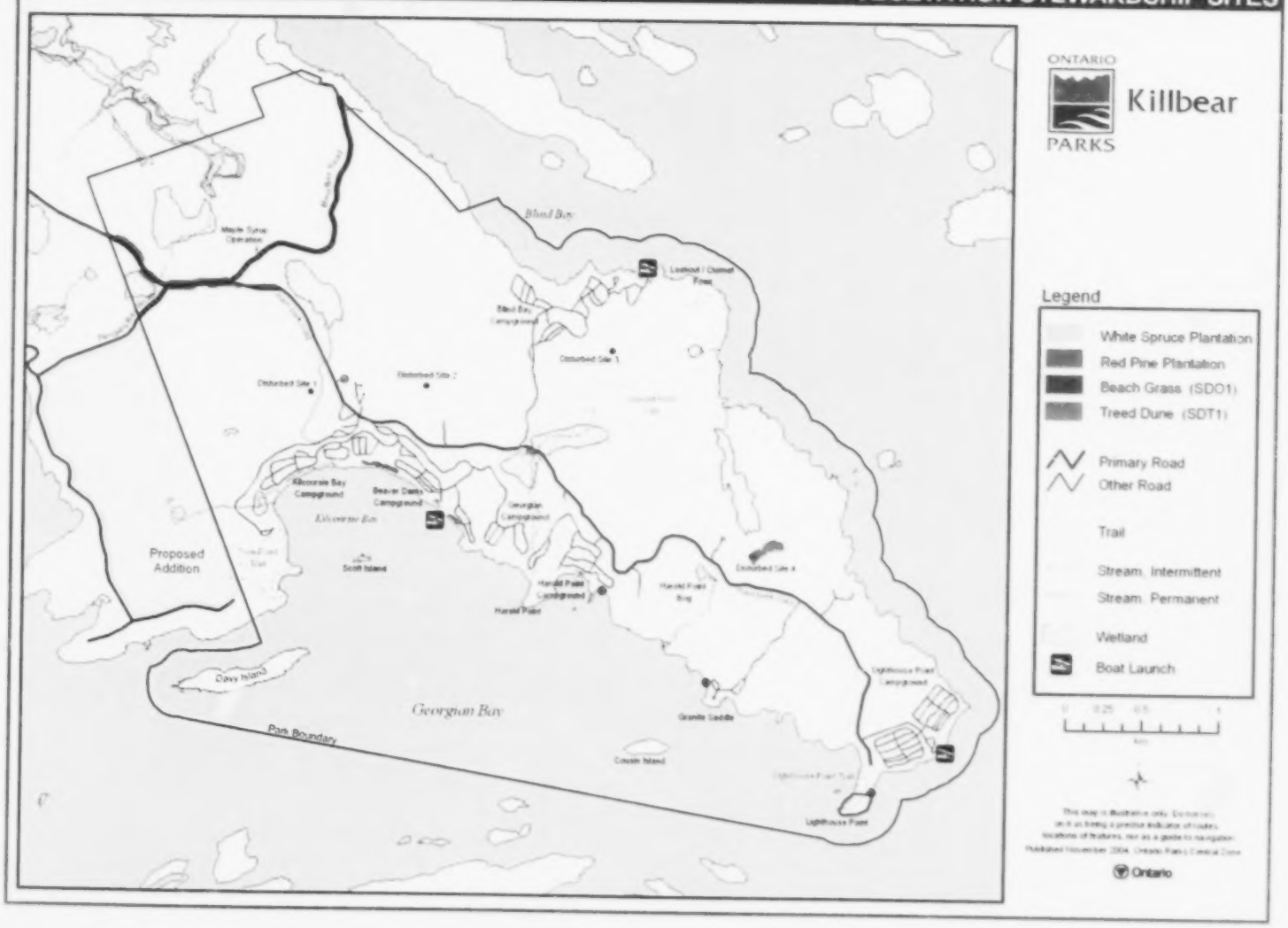
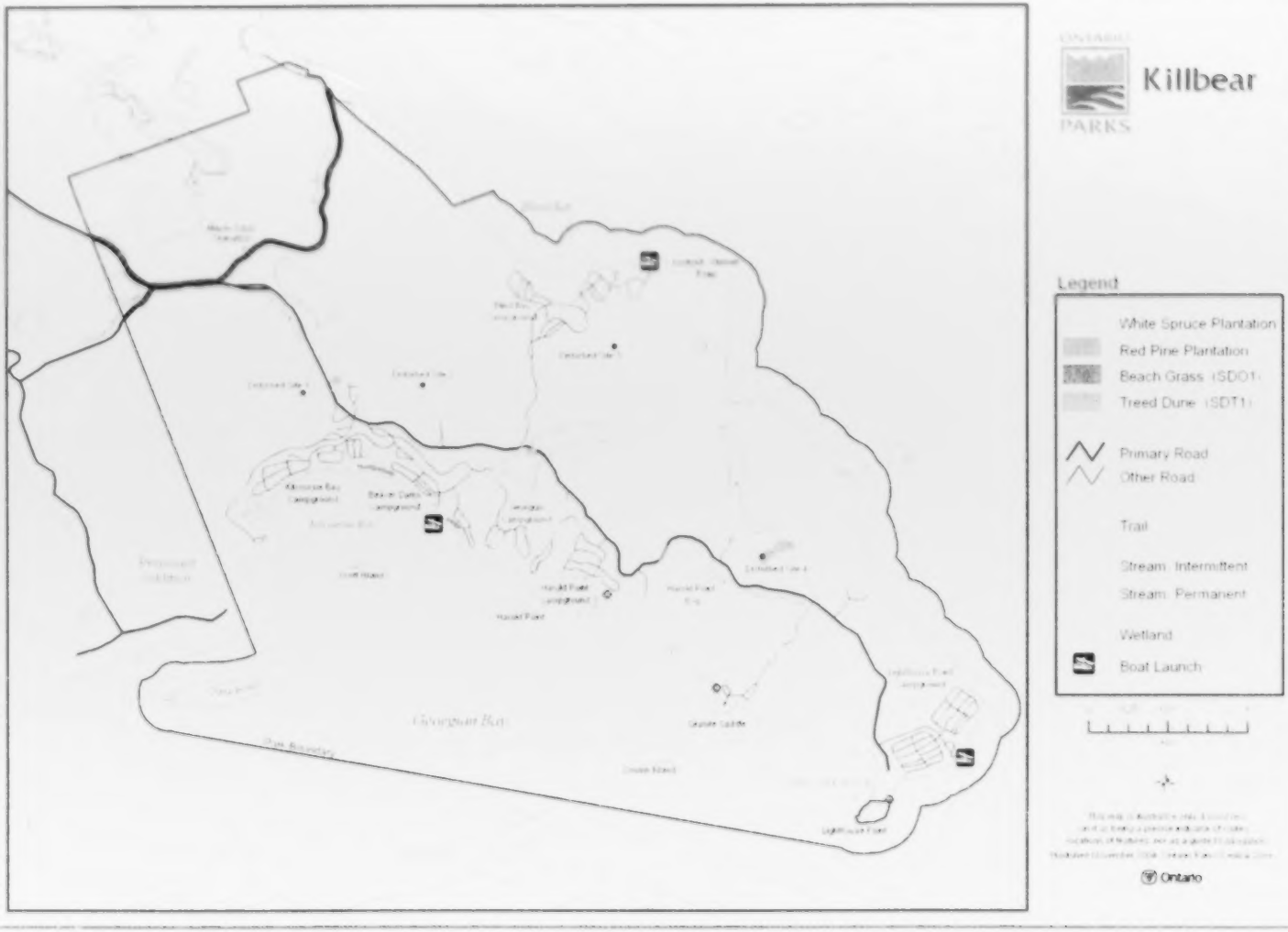


FIGURE 2 **VEGETATION STEWARDSHIP SITES**



The following information was taken from the park management plan (MNR 2000). Beginning in the early 1960's, research was undertaken on the effects of manipulating natural winter food supplies for White-tailed Deer. A series of 400 m^2 plots were cleared in the area around the Lookout Trail. These browse plots were clear cut to allow new growth to generate in order to provide winter food for the deer. A series of winter feeding stations were also operated in severe winters to supplement naturally available food sources. Both of these programs operated intermittently during the 1990's, depending on severity of winter conditions and availability of funding and manpower. Comments on the continuation of this program are found in Section 1.2.

At present, park staff clear vegetation annually along park roads in development zones to improve sight lines. Vegetation beneath and adjacent to power lines is cut every 3-5 years. This work is conducted under the guidance and coordination of park staff. A swath of vegetation approximately 1.5 m wide is also cleared every 3-5 years along the park perimeter. This is done to clearly define the park boundary and assist with enforcement of hunting regulations.

2.0 VEGETATION COMMUNITIES

The following summary of the vegetation communities at Killbear is based on detailed descriptions and mapping found in Kershaw (1997) and reconnaissance level surveys conducted by the author in 2003. To facilitate the vegetation stewardship process, communities have been separated into broad habitat groups. The common forest communities of Killbear are re-classified here using Chambers *et al.* (1997), which had not been published when Kershaw's life science inventory was prepared. Ecological Land Classification (ELC) for Southern Ontario (Lee *et al.* 1998) is intended for use in Ecoregions 7E and 6E, but the lack of a standardized classification for Ecoregion 5E necessitated its use for the description of selected (i.e., rare) non-forest ecosite types in Killbear. Forest and ELC ecosite types[1], which are the finest levels of classification, are identified in bold in the text below.

2.1 Native Forest

The upland forests at Killbear are dominated by the **Sugar Maple-Beech-Red Oak (ES25) Ecosite Type** and the **Sugar Maple-Yellow Birch (ES29) Ecosite Type**, which account for approximately 30% of the park area. An active nest of the provincially Vulnerable Red-shouldered Hawk is present in the ES25 Ecosite Type in the northwest part of the park. The **White Pine-Largetooth Aspen-Red Oak (ES14) Ecosite Type** occurs on about 20% of the land base on the drier uplands and rock outcrops. Kershaw (1997) did not break down the remaining percent of cover of the following forest types. The **Sugar Maple-Hemlock-**

[1] **Ecosites** and **vegetation types** are terms used in the ELC. Ecosites are areas with a homogeneous combination of soils and vegetation and are usually mapped at a scale of 1:10,000 or more. Vegetation types are a further subdivision of ecosites, and are based on species composition. The term **community** is used generally to describe vegetation assemblages.

Yellow Birch (ES28) Ecosite and the **Hemlock-Yellow Birch (ES30) Ecosite Type** are also common in Killbear. Imperfectly drained sites are characterized by the **White Cedar-Black Spruce-Tamarack (ES32)** and the **Lowland Hardwood (ES35) Ecosite Types**. None of these forest types are currently considered rare in Ontario but hibernacula of the provincially threatened Eastern Massasauga and Eastern Foxsnake are found in the park's native forests. Gestation sites for Eastern Massasauga are present in open bedrock barrens in the ES14 Ecosite Type.

A number of provincially rare vascular plants have been reported from native forest habitats in the study area. Rugulose Grape Fern (S2) was found along the Lookout Trail in 1969. This species was unsuccessfully searched for in 2003. This result is not surprising given the age of this record and the lack of detailed location information. In 1995, M. Oldham found Small-flowered Blue-eyed Mary (S3) at campsite #100 in the Kilcoursie Bay campground. New England Sedge (S3) was apparently found in Killbear in 1977 but no location information is provided and there is no record of it in the Ontario Natural Heritage Information Centre's (NHIC) database. This species normally inhabits mesic hardwood forests and openings. A specimen of Large Round-leaved Orchid (S2) was collected in 1969 from "15 m east of parking lot on Lookout Trail" in low deciduous forest. In the summer of 2004 K. Otterbein (Killbear Natural Heritage Education leader) "found four or five different plants on the Lookout Point trail" about 500 m in from the trailhead.

Virginia Bugleweed (S2) was reported in 1969, but this identification was changed to the much more common Northern Bugleweed by the original investigator (D. Brunton, pers. comm., 2004). In Ontario, Virginia Bugleweed is typically found on wooded floodplains south of the Canadian Shield.

2.2 Conifer Plantations

There are four main areas of conifer plantations in Killbear (Figure 2). The main park road between the western park boundary and the large entrance sign is lined with up to five rows of 20 m tall Red Pine, which were planted approximately 30 years ago. An area of <1 ha of 15 m Red Pine is present adjacent to the original park superintendent's residence. Approximately 100 m^2 of 6-10 m tall White Spruce is located on the southwest side of the Lookout Trail additional vehicle parking lot. Just east of this lot are nine, 90 m rows of Red Pine. A 1.3 ha plantation of Red Pine is present in the abandoned sand pit about 400 m east of Harold Point Bog.

2.3 Disturbed Areas

In the late 1970's and early 1980's an area of approximately 1 ha near the entrance gate was cleared and used as a baseball field (Disturbed Site 1, Figure 2). Presently the water table at this site is at or near the surface of its coarse

gravel and sand substrates. With the exception of scattered Spotted Knapweed, this area is vegetated with native herbs (e.g., Northern Bog Club-moss, Rough Horsetail, Variegated Horsetail, Lance-leaved Violet, Canada Rush), Shining Willow and regenerating (0.5-2.0 m) Eastern White Pine.

Hybrid Ladies' Tresses (S1) were found in the abandoned sand pit in NRZ 6 in 1977 (Disturbed Site 2, Figure 2). In the early 1980's this location was being used as a dump site for park refuse (i.e., disused fire grates), apparently out of ignorance of its significance and exact location (H. van Luit, Central Zone Senior Planner, pers. comm., 2004).

A small (< 1 ha) abandoned borrow pit under a power line off of the Lookout Point Trail (Disturbed Site 3, Figure 2) is currently being naturally re-colonized with Paper Birch and Red Oak saplings.

An impressive concentration of orchids (Grass Pink, Spotted Coral-root, Club Spur Orchid and Rose Pogonia) can be found in abandoned sand pit adjacent to the Red Pine plantation approximately 250 m east of Harold Point Bog (Disturbed Site 4, Figure 2). The water table at this site is at or near the surface of the sandy substrate.

2.4 Beaches and Headlands

Kershaw (1997) stated that there are over 4.3 linear km of sand beach along the shore of the west coast campgrounds and Lighthouse Point. Sandy beaches on the Georgian Bay Coast are rare in Ecoregion 5E-7 and their geologic significance has been well documented by Simpson (1979) and Noble (1983). The ecologic importance and condition of the natural beach west of Lighthouse Point was first described by Simpson (1979) as follows. The beach is of high interpretive value, as well as providing habitat for a number of unusual species. However, the beach shows signs of heavy erosion and is being denuded by uncontrolled use.

Kershaw (1997) provided a detailed description of the vegetation of the beaches, but stated that most of the beaches are maintained for recreational use and with few exceptions, the pre-development plant communities are no longer intact. Lawson (2003) and field surveys in 2003 support this assertion. Erosion and trampling were evidenced by exposed root masses of shoreline Eastern White Pine and sod mats. Vegetative reproduction and colonization of dunes by American Beachgrass was being negatively impacted by human trampling and temporary storage of windsurf boards. American Beachgrass is a provincially rare species (S3) and formed the dominant component of the provincially rare (S2) **American Dune Grass - Beach Pea - Sand Cherry Dune Grassland Vegetation Type (SDO1)**. In the 1970's American Beachgrass was actively removed in the park with the intent of increasing the size of unvegetated beaches (K. Otterbein, Chief Park Naturalist, pers. comm., 2003)

In October 2003 a *Populus* sp. was found in some backshore areas of the Kilcoursie Bay beach and near Harold Point. Based on fallen leaves, initial species identification suggest that these trees could be Eastern Cottonwood (*Populus deltoides*), which has never been previously recorded in Killbear and would be a northern range extension of this species along the Georgian Bay Coast. However, the possibility of them being Jack's Aspen (*P. balsamifera* X *deltoides* (= *P.* X *jackii*)), which is an S2, cannot be ruled out (D. Sutherland, NHIC Botanist, pers. comm., 2003) until more specimens are examined. Regardless of their identity, **Cottonwood/Balsam Poplar Treed Dune Vegetation Types (SDT1)** are extremely rare (S1) in Ontario.

Secund Rush (S2) was found on the beach just west of Lighthouse Point in 1977. Another provincial rarity (Crested Arrowhead – S3) was documented by Kershaw (1997) and was observed flowering on Blind Bay Beach in August 2000.

Killbear's headlands and rocky shores provide critical foraging habitat and hibernation sites for the local Eastern Foxsnake population (A. Lawson, Eastern Foxsnake Research Team Leader, pers. comm., 2003).

2.5 Wetlands

Drainage in Killbear is largely influenced by its bedrock geology. Water levels are controlled by Beaver activity in several locations and park roads have impacted local drainage patterns. The park's wetlands are important habitats for at least 13 species of amphibians and reptiles, many of which are species at risk and/or provincially rare. Submergent, emergent and floating-leaved herbaceous, shrubby and treed communities are among the wide variety of vegetation types present. A full description of wetland types found in Killbear is provided by Kershaw (1997). The highly invasive and non-native Purple Loosestrife has been reported for the park, but it has not been observed in recent years (K. Otterbein, pers. comm., 2003). The provincially rare (S1) Southern Twayblade was found in Harold Point 'Bog' in 1977.

Limestone Swamp Bedstraw (S2) was reported from the park in 1969. As its common name suggests, this species is especially characteristic of wet, calcareous bottomlands, a habitat which is not known to be present at Killbear. The NHIC has no records of this species from the park and states that it is infrequently listed on checklists, though undoubtedly confused with similar species. After checking with the original investigator, it was determined that this species was misidentified (D. Brunton, pers. comm., 2004) and was likely the very common and similar Small Bedstraw.

Three-seeded Sedge was first recorded in Killbear by Simpson (1979), however it wasn't stated which variety was present. In 2003 a specimen of var. *billingsii* (S2S3) was collected from a wetland near the beginning of the Lookout Trail. Swamp St. John's-wort (S3) was identified in the Kilcoursie Swamp and near the

entrance to the Lookout Trail in 1977. Suitable habitat for both of these taxa is found throughout the park and more populations are probably present.

3.0 GENERAL POLICIES

3.1 Forest and Plantation Stewardship

Given the overall good condition of most of the native forest in Killbear, few specific stewardship prescriptions are necessary. As discussed in Section 1.2, management of deer browse should be discontinued. No active management of the sugar bush is planned but consideration may be given to some small scale treatment of the area if it is deemed necessary to maintain the park's interpretive program. If the area ceases to be used as part of the interpretive program then no active management of the forest will occur. Forests in sensitive areas (e.g., raptor nesting sites; snake gestation sites and hibernacula) should be left undisturbed unless specific habitat improvements are recommended in a park wildlife stewardship plan.

Plantations of native conifers should be managed so they more closely mimic native forest structure and composition. This means removing the lines of trees along the main road north of the entrance gate. Conifer plantations should be thinned to a point where their numbers and distribution approximate those in adjacent undisturbed forests. Where it is practical, existing native vegetation in plantations should be protected during the implementation of stewardship activities. Where feasible, felled trees should be left in situ to provide wildlife habitat, recycle nutrients and reduce erosion.

3.2 Hazardous Trees and Windthrows

Standing dead trees (i.e., snags) provide critical habitat for a wide variety of wildlife. They also pose a safety hazard in areas frequented by park users. Traditionally snags have automatically been considered dangerous regardless of the actual risk they may have posed. Standing dead trees in development zones or along trails or roads will be removed if they pose a risk, but otherwise left in place and designated as wildlife trees. Broken or rotted limbs or crowns may be removed, leaving the trunk for wildlife habitat. Twenty-two species of cavity excavating (e.g., Pileated Woodpecker) and nesting (e.g., Hooded Merganser) birds have been found in the park. Cavities are also used as roost sites by a wide variety of forest wildlife. The presence of cavity dependent species enhances the experience of park users.

Windthrown trees will only be removed where they impede passage along roads or trails, or where the tree falls on mown portions of day-use areas. On trails, only that portion of the tree across the trail will be removed and all remaining wood will be left in place. In natural areas, fallen trees and limbs, or portions of, will be left in place as long as they do not pose a public safety risk. Among the

many functions of downed woody debris are provision of critical habitat for many species of wildlife, nutrient cycling and erosion control.

3.3 Herbicide Use

The Killbear Provincial Park Management Plan does not address herbicide use, but the policy regarding their application in provincial parks has been outlined by Ontario Parks (1993). Alternatives will be used where feasible (e.g., hand-pulling), but use of herbicides often provides the most effective control of exotic or undesirable species. At present, there is no immediate need to reduce or eliminate invasive exotic species at Killbear (Section 5.0) but small, localized applications may be used to control selected exotic species in the park. If a broader application becomes necessary, serious consideration of potential environmental impacts versus benefits will be given.

Only herbicides which biodegrade quickly, have low or no soil activity and for which environmental impacts have been tested and proven to be minimal will be used.

3.4 Insect Pests

It is widely documented that established defoliating insects such as Gypsy Moth (*Lymantria dispar*) and Forest Tent Caterpillar (*Malacosoma disstria*) pose potentially serious threats to forest vegetation. Given the cyclical nature of their populations, monitoring is vital to the prediction and control of outbreaks. However, the potential impacts and ability to control recently discovered wood boring insects such as the Emerald Ash Borer (*Agrilus planipennis*) and Asian Longhorned Beetle (*Anoplophora glabripennis*) are largely unknown. Park staff will need to be educated to recognize the various life stages of these insects and signs of infestations. Park staff will cooperate with Parry Sound MNR District staff in monitoring programs when necessary. Decisions regarding widespread control efforts will be made in cooperation with zone and Ontario Parks' provincial staff, the Parry Sound MNR District and the Canadian Food Inspection Agency.

3.5 White-tailed Deer

Populations of White-tailed Deer that exceed an ecosystem's carrying capacity can seriously decrease forest understorey species richness, diversity, structure and regeneration. The number of White-tailed Deer currently using Killbear is estimated at 25 in summer and 100 in winter (K. Otterbein, pers. comm. 2004) but the carrying capacity of Killbear is unknown. Seasonal increases in numbers coincide with the beginning of hunting season and most have moved back into the surrounding landscape by late March. Winter numbers were estimated at 250-300 when browse management was occurring. There is little evidence that the current numbers of White-tailed Deer using Killbear are having detrimental

impacts on the local ecology. There is no apparent difference in the structure and composition of vegetation in and adjacent to an exclosure on the Lookout Point Trail. The relatively low number of deer in the park has probably helped to maintain the overall good condition of the native forest understorey. Unless the number of White-tailed Deer increases significantly, no herd management will be required.

3.6 Fire

As mentioned in Section 1.4, fire has historically influenced the development of vegetation communities at Killbear. The current policy of fire suppression has undoubtedly degraded some habitats in the study area. Periodic fire favours the maintenance of diverse communities of native species. They also reduce fuel loads, which decreases the likelihood of large or intense fires that are difficult to control. From time to time, it may be necessary to rejuvenate selected habitats (e.g., Prairie Warbler breeding sites) through the use of prescribed burns and active fire management. Low intensity surface fires provide a competitive advantage for oaks, encourage oak regeneration and discourage undesired competition from other species (OMNR 2000). Any burning conducted within the park will be done by trained staff, while ensuring the safety of park visitors and property.

4.0 VEGETATION STEWARDSHIP UNITS AND PRESCRIPTIONS

Active vegetation management in Killbear is needed in the conifer plantations, disturbed areas and beaches (Figure 2). Vegetation management is also needed in Development Zones, especially degraded campsites, which are in native forests, but the strategy recommended here is to address the source of the problem (proactive management) rather than implement an extensive re-planting program (reactive management) as suggested in the park management plan (see also Section 1.2). However, some small-scale experimental planting should be done in a few (e.g., 10) campsites to help determine if Killbear park users will respect our efforts.

4.1 Conifer Plantations

Given the advanced condition of the native understorey along the main road north of the entrance gate, 50% of the Red Pine stems should be cut in a random distribution as soon as possible. Random felling of 25% of the original number of pines in 3-5 year cycles will occur until approximately 5% of the original number of trees remains. If park users are concerned about the visual impacts of harvesting along the main road, an interpretative sign could be erected or an information brochure prepared explaining the ecologic benefits of plantation stewardship.

Approximately 35% of the Red Pine trees near the original superintendent's residence should be cut as soon as possible. Stems selection will be randomized, but with small clusters of stem removal, so as to make small canopy gaps. Two subsequent cutting cycles should occur in 3-5 year intervals until approximately 5% of the original stand remains.

About 25% of the Red Pine stems along the road at the Lookout Trail parking lot should be felled as soon as possible. The existing Sugar Maple saplings will benefit from this initial cutting cycle. Random removal of 25% of the remaining Red Pines in 3-5 year cycles should occur until approximately 5% of the original number of trees remains. In the adjacent White Spruce stand, 50% of the trees should be felled immediately in a randomized with clusters pattern. In 5-7 years 50% of the remaining standing planted spruce will be cut. The remaining 25% of original stems should be unmanaged.

In the 1.3 ha stand of Red Pine east of Harold Point Bog, approximately 25% of the stems should be felled as soon as possible. This relatively light cut will allow enough light penetration to stimulate some natural understorey regeneration. Depending on the condition of the understorey, cutting cycles should be repeated every 5-7 years, with removal of 25% of the original number of stems until approximately 5% of the original stand remains. Stems selection will be randomized, but with small clusters of stem removal, so as to make small canopy gaps.

Although the greatest ecological benefits would be realized by leaving the felled trees in situ, consideration could be given to removing and using some of the trees. Logs could be sold to generate park revenue, converted to chips for use on park trails or placed around degraded campsites to discourage trampling of adjacent native vegetation. Access by people or equipment would be easier during subsequent management if some of the felled trees were removed.

4.2 Disturbed Sites

Disturbed Areas 1, 3 and 4 are naturally being colonized by native, early successional plant communities and no specific management is required. Disturbed Area 2 should be marked in the field and park staff should be informed of the significance of this site. If dumping or storage is still occurring, they should be coordinated with results of the rare plant survey described in Section 6.0.

4.3 Beaches and Wetlands

Selected plant communities on Killbear's beaches require enhanced management. The importance of rehabilitating the beach vegetation communities was documented by Lawson (2003). She states that Killbear's Eastern Foxsnakes spend the majority of their lives within 30 m of the shoreline and researchers have documented snakes using this habitat.

The first step to protecting the treed dunes is to positively identify the *Populus* sp. that occurs there and report the occurrence of this community type to the NHIC. American Beachgrass, treed dune and degraded communities can be protected by a combination of methods including public education, signage, fencing and providing designated sites for temporary storage of recreational watercraft such as wind surfers. By restricting pedestrian traffic in beach communities, the area of natural cover used by Eastern Foxsnakes would increase (Lawson 2003). The planned placement (e.g., as far from roads as possible) of dead vegetation (collected during campground and beach maintenance) in debris piles in the beach communities will increase the number of potential Eastern Foxsnake nesting sites and will discourage further trampling by park users. The higher quality habitat may encourage snakes to remain in the beach communities longer and not cross nearby roads where mortality rates are high.

The objectives of beach community stewardship are to reverse the trend of ongoing habitat degradation, restore the quality of existing degraded habitats and increase the area of the communities to a level that is balanced with the needs of park users. Detailed spatial data on the existing beach communities was collected in the fall of 2003 and can be used as a benchmark for management and monitoring activities.

Beaver ponds and meadows make an important contribution to the park's biodiversity. No effort will be taken to manage beaver dams or populations unless park infrastructure (e.g., roads) is threatened by flooding. If necessary, beavers may be removed from the park, but a preferred method of dealing with high water levels is to use "beaver bafflers" or a similar system to lower water levels in a non catastrophic way.

5.0 INTRODUCED AND INVASIVE SPECIES

Of the 435 taxa of vascular plants known to occur at Killbear Provincial Park, 58 (13%) are not native to Ontario and 18 (4%) are invasive (Appendix 1). Invasive species have the potential to move into areas and displace native species, which reduces biodiversity and impacts normal ecological processes. Approximately five invasive species have been intentionally introduced into the study area, primarily for their ease of establishment and erosion control values.

For high priority exotic species (e.g., Purple Loosestrife, Canada Thistle) and those that have not yet become widespread in the park (e.g., Spotted Knapweed) park staff or volunteers (under the direction of park staff) should remove all individuals. Complete removal of species that are more widespread or have higher reproductive potential may not be feasible. However, by implementing and maintaining appropriate vegetation stewardship activities (e.g., conversion of plantations and disturbed sites to native forest) habitat changes will likely favour native species.

6.0 SIGNIFICANT SPECIES AND SPECIES AT RISK

Thirteen provincially rare vascular plant taxa have been reported from Killbear, but two were misidentified (Sections 2.1 and 2.5). None of the 11 confirmed taxa are currently classified at risk by the MNR or COSEWIC. The general management strategy for all of the rare taxa is to:

1. search known and/or suitable locations and habitats to update the current status of rare vascular plant taxa in Killbear
2. if known or new rare taxa are located, protect and monitor their locations
3. regardless of their success, submit results of all searches to the NHIC and the Central Zone Ecologist, complete with UTM coordinate data collected in the field

Site protection may include strategies such as closing campsites, erecting signs, fencing or establishing plant debris barriers in strategic locations on the beaches or redirecting established park operations or trails away from sensitive areas. Table 1 lists known and potential locations to search for provincially rare vascular plant taxa that have been found in Killbear.

Table 1. Known and potential locations to search for provincially rare vascular plant taxa that have been found in Killbear Provincial Park.

Common Name	S-Rank	Habitat / Search Area
Rugulose Grape Fern	S2	low ground in the Lookout Point trailhead area
Swamp St. John's-wort	S3	wetland edges
Small-flowered Blue-eyed Mary	S3	dry soils at site #100 and adjacent area, Kilcoursie Bay campground
Crested Arrowhead	S3	Blind Bay Beach
Secund Rush	S2	Lighthouse Point area beaches
New England Sedge	S3	mesic forest openings
Billing's Three-seeded Sedge	S2S3	wetlands, especially along Lookout Point Trail
American Beachgrass	S3	sandy beaches on western shores
Southern Twayblade	S1	open areas in Harold Point Bog
Large Round-leaved Orchid	S2	low deciduous forest along Lookout Point Trail
Hybrid Ladies' Tresses	S1	disturbed site in Nature Reserve Zone 6

7.0 RESEARCH AND MONITORING

Research improves our knowledge of, and ability to, manage the park's resources. Monitoring is crucial to evaluating our management successes and failures and identifying effective alternatives. The proposed stewardship activities at Killbear provide opportunities for scientific research and monitoring. Because Ontario Parks has limited funding to support these activities, other agencies and institutions should be made aware of the potential prospects here. Further recommendations on research and monitoring can be found in the Central Zone strategic plans, which are currently under preparation.

Cutting of conifers in plantations have the potential to adversely affect the park ecosystem. Extensive blow down of both desirable and undesirable residual trees is possible if harvest levels exceed critical thresholds. Site disturbance and increased light levels resulting from tree removal and creation of canopy gaps may stimulate weed or undesirable shrub growth (e.g., Wild Red Raspberry). If monitoring reveals that spontaneous regeneration of native species under newly opened plantation canopies is inadequate, supplemental plantings should be considered. The results of monitoring of the responses of the earliest phases of conifer plantation management should be used to modify subsequent management, if necessary.

Once the public education campaign has been launched, monitoring of experimental campsite plantings and control sites will be required to determine their effectiveness. Depredation of plantings by White-tailed Deer and rodents may occur and if necessary, mitigation may be required.

Should the park boundary be amended along its western border, a detailed botanic inventory will be completed in the newly added land.

8.0 SUMMARY OF KEY STEWARDSHIP RECOMMENDATIONS

The following list, in order of priority, summarizes the key vegetation stewardship recommendations in Killbear Provincial Park:

- actively manage (i.e., protect and monitor) the provincially rare beach communities
- search for and monitor all known and new provincially rare vascular plants; document all efforts, regardless of success
- suspend all deer browse vegetation management activities
- mark the Hybrid Ladies' Tresses site in the field, inform park staff and suspend all detrimental park operations in area
- implement public education program regarding campground degradation
- over the next 10 years, cut 95% of Red Pine and 75% of White Spruce in existing plantations
- monitor Eastern Massasauga gestation sites and remove or trim shade trees if necessary

9.0 SUMMARY OF PUBLIC CONSULTATION

As directed by the Class Environmental Assessment for Provincial Parks and Conservation Reserves (MNR 2005), public consultation was an important part of the vegetation stewardship planning process. Once the draft plan was completed stakeholders and local residents were notified by mail. A paid advertisement appeared in the local newspaper and the plan was posted on the Ontario Parks website in January 2005. Paper copies of the plan were sent to those who requested it. Following the release of the notices and draft document there was a 45-day review and comment period. All public comments were carefully considered in the preparation of the final vegetation stewardship plan and a notice of completion was mailed to stakeholders that commented on the draft plan. The planning process was completed with release of the approved Killbear Vegetation Stewardship Plan in June 2005. Copies of the finalized document were distributed to individuals that participated in the planning process. This stewardship plan will be reviewed or amended as required.

10.0 LITERATURE CITED

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APPENDIX 1. List of 435 Vascular Plant Taxa Found in Killbear Provincial Park

* = non-native taxa
97 = Kershaw (1997) Life Science Inventory
03 = field observation by author, 2003
Comment: LR = locally rare in Ecodistrict 5E-7; ACP = Atlantic Coastal Plain Species;
INV = invasive taxa, priorities for control range from high (1) to low (5)

Family	Scientific Name	Authority	Common Name	S-Rank	97	03	Comment
Lycopodiaceae	*Diphasiastrum complanatum*	(L.) Holub.	Northern Running-pine	S5	X	X	LR
Lycopodiaceae	*Huperzia lucidula*	(Michaux) Trevisan	Shining Fir-moss	S5	X		
Lycopodiaceae	*Lycopodiella inundata*	(L.) Holub	Northern Bog Club-moss	S5	X	X	
Lycopodiaceae	*Lycopodium annotinum*	L.	Bristly Club-moss	S5	X	X	
Lycopodiaceae	*Lycopodium clavatum*	L.	Running Club-moss	S5	X		
Lycopodiaceae	*Lycopodium obscurum*	L.	Ground-pine	S4	X	X	
Selaginellaceae	*Selaginella rupestris*	(L.) Spring	Rock Spike-moss	S5	X		
Equisetaceae	*Equisetum arvense*	L.	Field Horsetail	S5	X		
Equisetaceae	*Equisetum hyemale*	L.	Rough Horsetail	S5	X		
Equisetaceae	*Equisetum palustre*	L.	Marsh Horsetail	S5	X		LR
Equisetaceae	*Equisetum pratense*	Ehrh.	Meadow Horsetail	S5	X		
Equisetaceae	*Equisetum sylvaticum*	L.	Woodland Horsetail	S5	X		
Equisetaceae	*Equisetum variegatum*	Schleich. ex F. Weber & D.M.H. Mohr	Variegated Horsetail	S5	X	X	LR
Ophioglossaceae	*Botrychium multifidum*	(Gmel.) Trev.	Leathery Grape Fern	S5	X		
Ophioglossaceae	*Botrychium rugulosum*	W.H. Wagner	Rugulose Grape Fern	S2	X		
Ophioglossaceae	*Botrychium virginianum*	(L.) Sw.	Rattlesnake Fern	S5	X		
Osmundaceae	*Osmunda cinnamomea*	L.	Cinnamon Fern	S5	X		
Osmundaceae	*Osmunda claytoniana*	L.	Interrupted Fern	S5	X		
Osmundaceae	*Osmunda regalis*	L.	Royal Fern	S5	X	X	
Dennstaedtiaceae	*Dennstaedtia punctilobula*	(Michx.) T. Moore	Hay-scented Fern	S5	X		
Dennstaedtiaceae	*Pteridium aquilinum*	(L.) Kuhn	Bracken Fern	S5	X	X	
Thelypteridaceae	*Phegopteris connectilis*	(Michx.) Watt	Northern Beech Fern	S5	X		
Thelypteridaceae	*Thelypteris noveboracensis*	(L.) Nieuwl.	New York Fern	S4S5	X	X	
Thelypteridaceae	*Thelypteris palustris*	Schott	Marsh Fern	S5	X	X	
Blechnaceae	*Woodwardia virginica*	(L.) Sm.	Virginia Chain Fern	S4	X		ACP
Dryopteridaceae	*Athyrium filix-femina var. angustum*		Northern Lady Fern	S5	X	X	

APPENDIX 1. List of 435 Vascular Plant Taxa Found in Killbear Provincial Park

* = non-native taxa
97 = Kershaw (1997) Life Science Inventory
03 = field observation by author, 2003
Comment: LR = locally rare in Ecodistrict 5E-7; ACP = Atlantic Coastal Plain Species;
INV = invasive taxa, priorities for control range from high (1) to low (5)

Family	Scientific Name	Authority	Common Name	S-Rank	97	03	Comment
Lycopodiaceae	*Diphasiastrum complanatum*	(L.) Holub.	Northern Running-pine	S5	X	X	LR
Lycopodiaceae	*Huperzia lucidula*	(Michaux) Trevisan	Shining Fir-moss	S5	X		
Lycopodiaceae	*Lycopodiella inundata*	(L.) Holub	Northern Bog Club-moss	S5	X	X	
Lycopodiaceae	*Lycopodium annotinum*	L.	Bristly Club-moss	S5	X	X	
Lycopodiaceae	*Lycopodium clavatum*	L.	Running Club-moss	S5	X		
Lycopodiaceae	*Lycopodium obscurum*	L.	Ground-pine	S4	X	X	
Selaginellaceae	*Selaginella rupestris*	(L.) Spring	Rock Spike-moss	S5	X		
Equisetaceae	*Equisetum arvense*	L.	Field Horsetail	S5	X		
Equisetaceae	*Equisetum hyemale*	L.	Rough Horsetail	S5	X		
Equisetaceae	*Equisetum palustre*	L.	Marsh Horsetail	S5	X		LR
Equisetaceae	*Equisetum pratense*	Ehrh.	Meadow Horsetail	S5	X		
Equisetaceae	*Equisetum sylvaticum*	L.	Woodland Horsetail	S5	X		
Equisetaceae	*Equisetum variegatum*	Schleich. ex F. Weber & D.M.H. Mohr	Variegated Horsetail	S5	X	X	LR
Ophioglossaceae	*Botrychium multifidum*	(Gmel.) Trev.	Leathery Grape Fern	S5	X		
Ophioglossaceae	*Botrychium rugulosum*	W.H. Wagner	Rugulose Grape Fern	S2	X		
Ophioglossaceae	*Botrychium virginianum*	(L.) Sw.	Rattlesnake Fern	S5	X		
Osmundaceae	*Osmunda cinnamomea*	L.	Cinnamon Fern	S5	X		
Osmundaceae	*Osmunda claytoniana*	L.	Interrupted Fern	S5	X		
Osmundaceae	*Osmunda regalis*	L.	Royal Fern	S5	X	X	
Dennstaedtiaceae	*Dennstaedtia punctilobula*	(Michx.) T. Moore	Hay-scented Fern	S5	X		
Dennstaedtiaceae	*Pteridium aquilinum*	(L.) Kuhn	Bracken Fern	S5	X	X	
Thelypteridaceae	*Phegopteris connectilis*	(Michx.) Watt	Northern Beech Fern	S5	X		
Thelypteridaceae	*Thelypteris noveboracensis*	(L.) Nieuwl.	New York Fern	S4S5	X	X	
Thelypteridaceae	*Thelypteris palustris*	Schott	Marsh Fern	S5	X	X	
Blechnaceae	*Woodwardia virginica*	(L.) Sm.	Virginia Chain Fern	S4	X		ACP
Dryopteridaceae	*Athyrium filix-femina var. angustum*		Northern Lady Fern	S5	X	X	

Family	Scientific Name	Authority	Common Name	S-Rank	97	03	Comment
Dryopteridaceae	*Cystopteris fragilis*	(L.) Bernh.	Fragile Fern	S5	X		
Dryopteridaceae	*Dryopteris carthusiana*	(Vill.) H.P. Fuchs	Spinulose Wood Fern	S5	X		
Dryopteridaceae	*Dryopteris cristata*	(L.) Gray	Crested Wood Fern	S5	X		
Dryopteridaceae	*Dryopteris intermedia*	(Muhl. ex Willd.) Gray	Evergreen Wood Fern	S5	X		
Dryopteridaceae	*Dryopteris marginalis*	(L.) Gray	Marginal Wood Fern	S5	X	X	
Dryopteridaceae	*Gymnocarpium dryopteris*	(L.) Newman	Oak Fern	S5	X		
Dryopteridaceae	*Matteuccia struthiopteris*	(L.) Todaro	Ostrich Fern	S5	X	X	
Dryopteridaceae	*Onoclea sensibilis*	L.	Sensitive Fern	S5	X	X	
Dryopteridaceae	*Polystichum acrostichoides*	(Michx.) Schott	Christmas Fern	S5	X		
Dryopteridaceae	*Woodsia ilvensis*	(L.) R. Br.	Rusty Woodsia	S5	X		
Polypodiaceae	*Polypodium virginianum*	L.	Rock Polypody	S5	X	X	
Pinaceae	*Abies balsamea*	(L.) P. Mill.	Balsam Fir	S5	X		
Pinaceae	*Larix laricina*	(Du Roi) K. Koch	Tamarack	S5	X	X	
Pinaceae	*Picea glauca*	(Moench) Voss	White Spruce	S5	X	X	
Pinaceae	*Picea mariana*	(P. Mill.) B.S.P.	Black Spruce	S5	X	X	
Pinaceae	*Pinus banksiana*	Lamb.	Jack Pine	S5	X		
Pinaceae	*Pinus resinosa*	Soland.	Red Pine	S5	X	X	
Pinaceae	*Pinus strobus*	L.	Eastern White Pine	S5	X	X	
Pinaceae	*Tsuga canadensis*	(L.) Carr.	Eastern Hemlock	S5	X	X	
Cupressaceae	*Juniperus communis var. depressa*	Pursh	Dwarf Juniper	S5	X	X	
Cupressaceae	*Thuja occidentalis*	L.	Eastern White Cedar	S5	X	X	
Taxaceae	*Taxus canadensis*	Marsh.	Canadian Yew	S5	X		
Nymphaeaceae	*Nuphar variegata*	Dur.	Bulhead Pond-lily	S5	X		
Nymphaeaceae	*Nymphaea odorata ssp. tuberosa*		Tuberous White Water-lily	SU	X		
Cabombaceae	*Brasenia schreberi*	J.F. Gmel.	Water-shield	S5	X	X	
Ceratophyllaceae	*Ceratophyllum demersum*	L.	Common Coontail	S5	X		
Ranunculaceae	*Actaea pachypoda*	Ell.	White Baneberry	S5	X		
Ranunculaceae	*Anemone americana*		Round-lobed Hepatica	S5	X	X	
Ranunculaceae	*Aquilegia canadensis*	L.	Wild Columbine	S5	X	X	
Ranunculaceae	*Coptis trifolia*	(L.) Salisb.	Goldthread	S5	X	X	
Ranunculaceae	*Ranunculus abortivus*	L.	Kidney-leaf Buttercup	S5	X		
Ranunculaceae	*Ranunculus acris**	L.	Tall Buttercup*	SE5	X		
Ranunculaceae	*Ranunculus fascicularis*	Muhl. ex Bigelow	Early Buttercup	S4	X		

Family	Scientific Name	Authority	Common Name	S-Rank	97	03	Comment
Ranunculaceae	*Thalictrum dioicum*	L.	Early Meadow-rue	S5	X		
Ranunculaceae	*Thalictrum pubescens*	Pursh	Tall Meadow-rue	S5	X		
Fumariaceae	*Corydalis sempervirens*	(L.) Pers.	Pale Corydalis	S5	X		
Fumariaceae	*Dicentra cucullaria*	(L.) Bernh.	Dutchman's-breeches	S5	X		
Ulmaceae	*Ulmus americana*	L.	White Elm	S5	X		
Myricaceae	*Myrica gale*	L.	Sweet Gale	S5	X	X	
Fagaceae	*Fagus grandifolia*	Ehrh.	American Beech	S5	X	X	
Fagaceae	*Quercus rubra*	L.	Red Oak	S5	X	X	
Betulaceae	*Alnus incana*	(L.) Moench	Speckled Alder	S5	X	X	
Betulaceae	*Betula alleghaniensis*	Britt.	Yellow Birch	S5	X	X	
Betulaceae	*Betula papyrifera*	Marsh.	White Birch	S5	X	X	
Betulaceae	*Corylus cornuta*	Marsh.	Beaked Hazel	S5	X		
Betulaceae	*Ostrya virginiana*	(P. Mill.) K. Koch	Hop Hornbeam	S5	X		
Chenopodiaceae	*Chenopodium album(*)*	L.	White Goosefoot*	SE5	X		
Chenopodiaceae	*Chenopodium glaucum ssp. glaucum**	L.	Oak-leaved Goosefoot*	SE5	X		
Chenopodiaceae	*Chenopodium simplex*	(Torr.) Raf.	Maple-leaved Goosefoot	S5	X		LR
Portulaceae	*Claytonia virginica*	L.	Virginia Spring Beauty	S5	X		
Molluginaceae	*Mollugo verticillata**	L.	Whorled Carpetweed*	SE5		X	
Caryophyllaceae	*Cerastium arvense(*)*	L.	Field Chickweed(*)	S5	X		
Caryophyllaceae	*Cerastium fontanum**	Baumg.	Common Mouse-ear Chickweed*	SE5	X		
Caryophyllaceae	*Stellaria media**	(L.) Vill.	Common Stitchwort*	SE5	X		
Polygonaceae	*Polygonum achoreum*	Blake	Leathery Knotweed	S5	X		
Polygonaceae	*Polygonum amphibium*	L.	Water Smartweed	S5	X		
Polygonaceae	*Polygonum cilinode*	Michx.	Fringed Black Bindweed	S5	X	X	
Polygonaceae	*Polygonum convolvulus**	L.	Black Bindweed*	SE5	X		
Polygonaceae	*Polygonum pensylvanicum*	L.	Pennsylvania Smartweed	S5	X		LR
Polygonaceae	*Polygonum punctatum*	Ell.	Dotted Smartweed	S5	X		
Polygonaceae	*Polygonum sagittatum*	L.	Arrow-leaved Tearthumb	S4	X		
Polygonaceae	*Rumex acetosella**	L.	Sheep Sorrel*	SE5	X		INV4
Polygonaceae	*Rumex crispus**	L.	Curly-leaf Dock*	SE5	X		
Clusiaceae	*Hypericum kalmianum*	L.	Kalm's St. John's-wort	S4	X		
Clusiaceae	*Hypericum mutilum ssp. boreale*	(Britt.) J. Gillett	Northern St. John's-wort	S5	X		
Clusiaceae	*Hypericum perforatum**	L.	Common St. John's-wort*	SE5	X		INV4

Family	Scientific Name	Authority	Common Name	S-Rank	97	03	Comment
Clusiaceae	*Triadenum fraseri*	(Spach) Gleason	Fraser's St. John's-wort	S5	X		
Clusiaceae	*Triadenum virginicum*	(L.) Raf.	Swamp St. John's-wort	S3	X		ACP
Tiliaceae	*Tilia americana*	L.	American Basswood	S5	X	X	
Sarraceniaceae	*Sarracenia purpurea*	L.	Pitcher-plant	S5	X		
Droseraceae	*Drosera intermedia*	Hayne	Spoon-leaved Sundew	S5	X		ACP
Droseraceae	*Drosera rotundifolia*	L.	Round-leaved Sundew	S5	X	X	
Violaceae	*Viola cucullata*	Ait.	Marsh Blue Violet	S5	X		
Violaceae	*Viola lanceolata*	L.	Lance-leaved Violet	S4	X	X	ACP
Violaceae	*Viola macloskeyi*	Lloyd	Macloskey's Violet	S5	X		
Violaceae	*Viola nephrophylla*	Greene	Northern Bog Violet	S4	?		
Violaceae	*Viola pubescens*	Ait.	Downy Yellow Violet	S5	X		
Violaceae	*Viola sororia*	Willd.	Woolly Blue Violet	S5	X		
Salicaceae	*Populus balsamifera*	L.	Balsam Poplar	S5	X	X	
Salicaceae	*Populus grandidentata*	Michx.	Large-tooth Aspen	S5	X	X	
Salicaceae	*Populus tremuloides*	Michx.	Trembling Aspen	S5	X	X	
Salicaceae	*Salix bebbiana*	Sarg.	Long-beaked Willow	S5	X		
Salicaceae	*Salix discolor*	Muhl.	Pussy Willow	S5	X		
Salicaceae	*Salix eriocephala*	Michx.	Missouri Willow	S5	X		
Salicaceae	*Salix humilis*	Marsh.	Prairie Willow	S5	X		
Salicaceae	*Salix lucida*	Muhl.	Shining Willow	S5	X	X	
Salicaceae	*Salix petiolaris*	Sm.	Slender Willow	S5	X		
Salicaceae	*Salix pyrifolia*	Anderss.	Balsam Willow	S5	X		
Brassicaceae	*Capsella bursa-pastoris**	(L.) Medik.	Shepherd's Purse*	SE5	X		
Brassicaceae	*Cardamine diphylla*	(Michx.) Wood	Two-leaved Toothwort	S5	X		LR
Ericaceae	*Andromeda polifolia ssp. glaucophylla*	(Link) Hulten	Bog Rosemary	S5	X		
Ericaceae	*Arctostaphylos uva-ursi*	(L.) Spreng.	Bearberry	S5	X		
Ericaceae	*Chamaedaphne calyculata*	(L.) Moench	Leatherleaf	S5	X		
Ericaceae	*Gaultheria hispidula*	(L.) Muhl. ex Bigelow	Creeping Snowberry	S5	X	X	
Ericaceae	*Gaultheria procumbens*	L.	Wintergreen	S5	X		
Ericaceae	*Gaylussacia baccata*	(Wangenh.) K. Koch	Black Huckleberry	S4	X		
Ericaceae	*Kalmia angustifolia*	L.	Sheep Laurel	S5	X	X	LR
Ericaceae	*Kalmia polifolia*	Wangenh.	Bog Laurel	S5	X		

Family	Scientific Name	Authority	Common Name	S-Rank	97	03	Comment
Ericaceae	*Ledum groenlandicum*	Oeder	Labrador-tea	S5	X		
Ericaceae	*Vaccinium angustifolium*	Ait.	Low Sweet Blueberry	S5	X	X	
Ericaceae	*Vaccinium macrocarpon*	Ait.	Large Cranberry	S4S5	X		
Ericaceae	*Vaccinium myrtilloides*	Michx.	Velvet-leaf Blueberry	S5	X		
Ericaceae	*Vaccinium oxycoccus*	L.	Small Cranberry	S5	X	X	
Pyrolaceae	*Chimaphila umbellata*	(L.) W. Bart.	Common Pipsissewa	S5	X		
Pyrolaceae	*Pyrola americana*	Sweet	Round-leaved Pyrola	S4?	X		LR
Pyrolaceae	*Pyrola asarifolia*	Michx.	Pink Pyrola	S5	X		LR
Pyrolaceae	*Pyrola chlorantha*	Sw.	Green-flowered Pyrola	S4S5	X		
Pyrolaceae	*Pyrola elliptica*	Nutt.	Shinleaf	S5	X		
Monotropaceae	*Monotropa hypopithys*	L.	Pinesap	S4	X		
Monotropaceae	*Monotropa uniflora*	Linnaeus	Indian-pipe	S5	X	X	
Primulaceae	*Lysimachia terrestris*	(L.) B.S.P.	Swamp Loosestrife	S5	X	X	
Primulaceae	*Lysimachia thyrsiflora*	L.	Tufted Loosestrife	S5	X		
Primulaceae	*Trientalis borealis*	Raf.	Star-flower	S5	X	X	
Grossulariaceae	*Ribes glandulosum*	Grauer	Skunk Currant	S5	X		
Grossulariaceae	*Ribes hirtellum*	Michx.	Smooth Gooseberry	S5	X		
Saxifragaceae	*Saxifraga virginiensis*	Michx.	Early Saxifrage	S5	X		
Rosaceae	*Amelanchier arborea*	(Michx. f.) Fern.	Downy Serviceberry	S5	X		
Rosaceae	*Amelanchier laevis*	Wieg.	Allegheny Serviceberry	S5	X		
Rosaceae	*Amelanchier sanguinea*	(Pursh) DC.	Roundleaf Juneberry	S5?	X		
Rosaceae	*Aronia melanocarpa*	(Michx.) Ell.	Black Chokeberry	S5	X		
Rosaceae	*Fragaria virginiana*	Duchesne	Virginia Strawberry	S5	X		
Rosaceae	*Physocarpus opulifolius*	(L.) Maxim.	Eastern Ninebark	S5	X	X	LR
Rosaceae	*Potentilla norvegica*	L.	Norwegian Cinquefoil	S5		X	
Rosaceae	*Potentilla palustris*	(L.) Scop.	Marsh Cinquefoil	S5	X		
Rosaceae	*Potentilla recta**	L.	Sulphur Cinquefoil*	SE5	X	X	
Rosaceae	*Potentilla simplex*	Michx.	Old-field Cinquefoil	S5		X	
Rosaceae	*Prunus pensylvanica*	L. f.	Pin Cherry	S5	X		
Rosaceae	*Prunus serotina*	Ehrh.	Black Cherry	S5	X		
Rosaceae	*Prunus virginiana*	L.	Choke Cherry	S5	X		
Rosaceae	*Rosa sp.**	L.	Rose*	n/a	X		
Rosaceae	*Rosa acicularis*	Lindl.	Prickly Rose	S5	X		
Rosaceae	*Rubus allegheniensis*	Porter	Allegheny Blackberry	S5	X		

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Rosaceae	*Rubus hispidus*	L.	Trailing Blackberry	S4S5	X		
Rosaceae	*Rubus idaeus ssp. melanolasius*	(Dieck) Focke	Wild Red Raspberry	S5	X		
Rosaceae	*Rubus pubescens*	Raf.	Dwarf Raspberry	S5	X	X	
Rosaceae	*Sorbus americana*	Marsh.	American Mountain-ash	S5	X	X	
Rosaceae	*Spiraea alba*	Du Roi	Narrow-leaved Meadow-sweet	S5	X		
Rosaceae	*Spiraea tomentosa*	L.	Tomentose Meadow-sweet	S4S5	X		
Fabaceae	*Lathyrus japonicus*	Willd.	Beach Pea	S4	X	X	
Fabaceae	*Lathyrus palustris*	L.	Marsh Vetchling	S5	X		
Fabaceae	*Lotus corniculatus**	L.	Bird's-foot Trefoil*	SE5	X		INV2
Fabaceae	*Trifolium aureum**	Pollich	Yellow Clover*	SE5	X		
Fabaceae	*Trifolium hybridum**	L.	Alsike Clover*	SE5	X		
Fabaceae	*Trifolium pratense**	L.	Red Clover*	SE5	X	X	INV4
Fabaceae	*Trifolium repens**	L.	White Clover*	SE5	X	X	INV4
Fabaceae	*Vicia cracca**	L.	Tufted Vetch*	SE5	X		INV2
Haloragaceae	*Myriophyllum alterniflorum*	DC.	Alternate-flowered Water-milfoil	S4	X		
Lythraceae	*Lythrum salicaria**	L.	Purple Loosestrife*	SE5	X		INV1
Onagraceae	*Circaea alpina*	L.	Smaller Enchanter's Nightshade	S5	X		
Onagraceae	*Circaea lutetiana*	L.	Yellowish Enchanter's Nightshade	S5	X		
Onagraceae	*Epilobium angustifolium*	L.	Fireweed	S5	X		
Onagraceae	*Epilobium ciliatum ssp. glandulosum*	(Lehm.) Hoch & Raven	Northern Willow-herb	SU	X		
Onagraceae	*Epilobium leptophyllum*	Raf.	Narrow-leaved Willow-herb	S5	X		
Onagraceae	*Epilobium palustre*	L.	Marsh Willow-herb	S5	X		LR
Onagraceae	*Oenothera biennis*	L.	Common Evening-primrose	S5	X		
Cornaceae	*Cornus canadensis*	L.	Bunchberry	S5	X	X	
Cornaceae	*Cornus rugosa*	Lam.	Round-leaved Dogwood	S5	X		
Cornaceae	*Cornus stolonifera*	Michx.	Red-osier Dogwood	S5	X		
Santalaceae	*Comandra umbellata*	(L.) Nutt.	Bastard Toad-flax	S5	X		
Aquifoliaceae	*Ilex verticillata*	(L.) Gray	Winterberry	S5	X	X	
Aquifoliaceae	*Nemopanthus mucronatus*	(L.) Loes.	Mountain-holly	S5	X	X	
Euphorbiaceae	*Chamaesyce glyptosperma**	(Engelm.) Small	Ring-seeded Spurge*	SE5	X		

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Euphorbiaceae	*Chamaesyce maculata*	(L.) Small	Spotted Spurge	SE5			found by author in Sept. 2005
Aceraceae	*Acer pensylvanicum*	L.	Striped Maple	S5	X	X	
Aceraceae	*Acer rubrum*	L.	Red Maple	S5	X	X	
Aceraceae	*Acer saccharum ssp. saccharum*	Marsh.	Sugar Maple	S5	X	X	
Aceraceae	*Acer spicatum*	Lam.	Mountain Maple	S5	X		
Anacardiaceae	*Rhus radicans ssp. rydbergii*	(Small ex Rydb.) McNeill	Western Poison-ivy	S5	X		
Anacardiaceae	*Rhus typhina*	L.	Staghorn Sumac	S5	X	X	
Oxalidaceae	*Oxalis acetosella*	L.	True Wood-sorrel	S5	X		
Oxalidaceae	*Oxalis stricta*	L.	Upright Yellow Wood-sorrel	S5	X		
Geraniaceae	*Geranium bicknellii*	Britt.	Bicknell's Crane's-bill	S4	X		
Geraniaceae	*Geranium robertianum**	L.	Herb-robert*	SE5	X		
Balsaminaceae	*Impatiens capensis*	Meerb.	Spotted Jewel-weed	S5	X	X	
Araliaceae	*Aralia hispida*	Vent.	Bristly Sarsaparilla	S5	X	X	
Araliaceae	*Aralia nudicaulis*	L.	Wild Sarsaparilla	S5	X	X	
Araliaceae	*Aralia racemosa*	L.	Spikenard	S5	X	X	
Araliaceae	*Panax trifolius*	L.	Dwarf Ginseng	S4	X		LR
Apiaceae	*Cicuta bulbifera*	L.	Bulb-bearing Water-hemlock	S5	X		
Apiaceae	*Daucus carota**	L.	Wild Carrot*	SE5	X		
Apiaceae	*Osmorhiza claytonii*	(Michx.) C.B. Clarke	Woolly Sweet-cicely	S5	X		
Apiaceae	*Sium suave*	Walt.	Hemlock Water-parsnip	S5	X		
Apocynaceae	*Apocynum androsaemifolium*	L.	Spreading Dogbane	S5	X		
Asclepiadaceae	*Asclepias incarnata*	L.	Swamp Milkweed	S5	X		
Asclepiadaceae	*Asclepias syriaca*	L.	Common Milkweed	S5	X		
Convolvulaceae	*Convolvulus arvensis**	L.	Field Bindweed*	SE5	X		INV3
Menyanthaceae	*Menyanthes trifoliata*	L.	Three-leaved Buckbean	S5	X		
Boraginaceae	*Myosotis scorpioides**	L.	True Forget-me-not*	SE5	?		INV4
Boraginaceae	*Myosotis stricta**	Link ex Roemer & J.A. Schultes	Small-flowered Forget-me-not*	SE4	X		
Verbenaceae	*Verbena hastata*	L.	Blue Vervain	S5		X	
Lamiaceae	*Galeopsis tetrahit**	L.	Common Hemp-nettle*	SE5	X		
Lamiaceae	*Lycopus americanus*	Muhl. ex W. Bart.	American Bugleweed	S5	X	X	

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Lamiaceae	*Lycopus uniflorus*	Michx.	Northern Bugleweed	S5	X		
Lamiaceae	*Prunella vulgaris ssp. lanceolata*	(W. Bart.) Hulten	Heal-all	S5		X	
Lamiaceae	*Scutellaria galericulata*	L.	Hooded Skullcap	S5	X		
Lamiaceae	*Scutellaria lateriflora*	L.	Mad-dog Skullcap	S5	X		
Plantaginaceae	*Plantago lanceolata**	L.	English Plantain*	SE5	X		
Plantaginaceae	*Plantago major**	L.	Common Plantain*	SE5	X		
Oleaceae	*Fraxinus americana*	L.	White Ash	S5	X	X	
Oleaceae	*Fraxinus nigra*	Marsh.	Black Ash	S5	X		
Oleaceae	*Fraxinus pennsylvanica*	Marsh.	Red Ash	S5	X		
Scrophulariaceae	*Agalinis paupercula*	(Gray) Britt.	Small-flowered Agalinis	S4S5	X	X	
Scrophulariaceae	*Collinsia parviflora*	Lindl.	Small-flowered Blue-eyed Mary	S3			NHIC
Scrophulariaceae	*Linaria vulgaris**	P. Mill.	Butter-and-eggs*	SE5	X		INV4
Scrophulariaceae	*Melampyrum lineare*	Desr.	Cow-wheat	S4S5	X	X	
Scrophulariaceae	*Verbascum thapsus**	L.	Common Mullein*	SE5	X		
Scrophulariaceae	*Veronica officinalis**	L.	Common Speedwell*	SE5	X		
Orobanchaceae	*Epifagus virginiana*	(L.) W. Bart.	Beech-drops	S5	X	X	
Lentibulariaceae	*Utricularia cornuta*	Michx.	Horned Bladderwort	S5	X		ACP
Lentibulariaceae	*Utricularia gibba*	L.	Humped Bladderwort	S4	X		LR, ACP
Lentibulariaceae	*Utricularia purpurea*	Walt.	Purple Bladderwort	S4	?		ACP
Lentibulariaceae	*Utricularia vulgaris*	L.	Greater Bladderwort	S5	X		
Campanulaceae	*Campanula aparinoides*	Pursh	Marsh Bellflower	S5	X		
Campanulaceae	*Lobelia cardinalis*	L.	Cardinal-flower	S5	X		
Campanulaceae	*Lobelia inflata*	L.	Indian-tobacco	S5	X		
Rubiaceae	*Galium asprellum*	Michx.	Rough Bedstraw	S5	X		
Rubiaceae	*Galium brevipes*	Fern. & Wieg.	Limestone Swamp Bedstraw	S2?	X		
Rubiaceae	*Galium trifidum*	L.	Small Bedstraw	S5	X		
Rubiaceae	*Galium triflorum*	Michx.	Sweet-scented Bedstraw	S5	X		
Rubiaceae	*Mitchella repens*	L.	Partridge-berry	S5	X	X	
Caprifoliaceae	*Diervilla lonicera*	P. Mill.	Northern Bush-honeysuckle	S5	X	X	
Caprifoliaceae	*Linnaea borealis*	L.	Twinflower	S5	X		
Caprifoliaceae	*Lonicera canadensis*	Bartr. ex Marsh.	American Fly Honeysuckle	S5	X		
Caprifoliaceae	*Lonicera dioica*	L.	Glaucous Honeysuckle	S5	X		
Caprifoliaceae	*Sambucus canadensis*	L.	Common Elderberry	S5	X		
Caprifoliaceae	*Sambucus racemosa*	L.	European Red Elder	S5	X	X	INV5

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Caprifoliaceae	*Viburnum cassinoides*	L.	Northern Wild-raisin	S5	X	X	
Caprifoliaceae	*Viburnum lantanoides*	Michx.	Hobblebush	S5	X	X	
Caprifoliaceae	*Viburnum lentago*	L.	Nannyberry	S5	X		
Asteraceae	*Achillea millefolium ssp. lanulosa*	(Nutt.) Piper	Woolly Yarrow	S5	X	X	
Asteraceae	*Ambrosia artemisiifolia*	L.	Annual Ragweed	S5	X	X	
Asteraceae	*Anaphalis margaritacea*	(L.) Benth. & Hook. f.	Pearly Everlasting	S5	X	X	
Asteraceae	*Antennaria howellii ssp. petaloidea*	(Fern.) Bayer	Field Pussytoes	SU	X		
Asteraceae	*Arctium minus**	Bernh.	Lesser Burdock*	SE5	X		
Asteraceae	*Bidens cernua*	L.	Nodding Beggar-ticks	S5	X	X	
Asteraceae	*Bidens discoidea*	(Torr. & Gray) Britt.	Discoid Beggar-ticks	S4	X		ACP
Asteraceae	*Bidens frondosa*	L.	Devil's Beggar-ticks	S5	X		
Asteraceae	*Bidens tripartita*	L.	European Beggar-ticks	S5	X		
Asteraceae	*Centaurea maculosa**	Lam.	Spotted Knapweed*	SE5		X	INV3
Asteraceae	*Chrysanthemum leucanthemum**	L.	Ox-eye Daisy*	SE5	X	X	
Asteraceae	*Cichorium intybus**	L.	Chicory*	SE5	X		
Asteraceae	*Cirsium arvense**	(L.) Scop.	Canada Thistle*	SE5	X		INV1
Asteraceae	*Cirsium vulgare**	(Savi) Ten.	Bull Thistle*	SE5	X		
Asteraceae	*Doellingeria umbellata var. umbellata*	(P. Mill.) Nees	Flat-top White Aster	S5	X	X	
Asteraceae	*Erigeron philadelphicus ssp. philadelphicus*	L.	Philadelphia Fleabane	S5	X		
Asteraceae	*Erigeron strigosus*	Muhl. ex Willd.	Daisy Fleabane	S5	X		
Asteraceae	*Eupatorium maculatum ssp. maculatum*	L.	Spotted Joe-pye Weed	S5	X		
Asteraceae	*Eupatorium perfoliatum*	L.	Perfoliate Thoroughwort	S5	X	X	
Asteraceae	*Eurybia macrophylla*	(L.) Cass.	Large-leaf Wood-aster	S5	X	X	
Asteraceae	*Euthamia graminifolia*	(L.) Nutt.	Flat-topped Bushy Goldenrod	S5	X	X	
Asteraceae	*Gnaphalium uliginosum**	L.	Low Cudweed*	SE5	X		
Asteraceae	*Hieracium aurantiacum**	L.	Orange Hawkweed*	SE5	X		INV3
Asteraceae	*Hieracium pilosella**	L.	Mouse-ear Hawkweed*	SE5	X		
Asteraceae	*Lactuca canadensis*	L.	Canada Lettuce	S5	X		
Asteraceae	*Lactuca serriola**	L.	Prickly Lettuce*	SE5	X		
Asteraceae	*Matricaria matricarioides**	(Less.) Porter	Pineapple-weed*	SE5	X		

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Asteraceae	*Prenanthes alba*	L.	White Rattlesnake-root	S5	X		
Asteraceae	*Prenanthes altissima*	L.	Tall White Rattlesnake-root	S5	X		
Asteraceae	*Rudbeckia hirta*	L.	Black-eyed Susan	S5	X		
Asteraceae	*Solidago canadensis var. canadensis*	L.	Canada Goldenrod	S5	X		
Asteraceae	*Solidago rugosa*	P. Mill.	Rough Goldenrod	S5	X		
Asteraceae	*Solidago uliginosa*	Nutt.	Bog Goldenrod	S5	X		
Asteraceae	*Sonchus arvensis ssp. arvensis**	L.	Field Sow-thistle*	SE5	X		
Asteraceae	*Sonchus asper**	(L.) Hill	Spiny-leaved Sow-thistle*	SE5	X		
Asteraceae	*Symphyotrichum ciliolatum*	(Lindl.) A. & D. Love	Ciliolate Aster	S5	X		
Asteraceae	*Symphyotrichum lanceolatum ssp. lanceolatum*	(Willd.) Nesom	Tall White Aster	S5	X		
Asteraceae	*Symphyotrichum novae-angliae*	(L.) Nesom	New England Aster	S5	X		
Asteraceae	*Symphyotrichum puniceum*	(L.) A. & D. Love	Purple-stemmed Aster	S5	X		
Asteraceae	*Taraxacum officinale**	G.H. Weber ex Wiggers	Common Dandelion*	SE5	X		
Asteraceae	*Tragopogon pratensis**	L.	Meadow Goat's-beard*	SE5	X		
Alismataceae	*Sagittaria graminea var. cristata*	Engelm.	Crested Arrowhead	S3	X		
Alismataceae	*Sagittaria latifolia*	Willd.	Broad-leaved Arrowhead	S5	X		
Hydrocharitaceae	*Vallisneria americana*	Michx.	Eel-grass	S5	X		
Scheuchzeriaceae	*Scheuchzeria palustris*	L.	Marsh Scheuchzeria	S4S5	X		LR
Potamogetonaceae	*Potamogeton amplifolius*	Tuckerman	Large-leaved Pondweed	S5	X		
Potamogetonaceae	*Potamogeton epihydrus*	Raf.	Ribbon-leaf Pondweed	S4S5	X		
Potamogetonaceae	*Potamogeton gramineus*	L.	Grass-like Pondweed	S5	X		
Potamogetonaceae	*Potamogeton natans*	L.	Floating Pondweed	S5	X		
Potamogetonaceae	*Potamogeton oakesianus*	J.W. Robbins	Oakes' Pondweed	S4	X		LR, ACP
Potamogetonaceae	*Potamogeton richardsonii*	(Benn.) Rydb.	Richardson's Pondweed	S5	X		
Potamogetonaceae	*Potamogeton vaseyi*	J.W. Robbins	Vasey's Pondweed	S4	X		LR
Araceae	*Arisaema triphyllum*	(L.) Schott	Jack-in-the-pulpit	S5	X		
Araceae	*Calla palustris*	L.	Wild Calla	S5	X	X	
Lemnaceae	*Lemna minor*	L.	Lesser Duckweed	S5	X	X	
Lemnaceae	*Spirodela polyrhiza*		Greater Duckweed	S5	X		
Juncaceae	*Juncus balticus*	Willd.	Baltic Rush	S5		X	
Juncaceae	*Juncus brevicaudatus*	(Engelm.) Fern.	Short-tailed Rush	S5	X		

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Juncaceae	*Juncus bufonius*	L.	Toad Rush	S5	X		
Juncaceae	*Juncus canadensis*	J. Gay ex Laharpe	Canada Rush	S5	X		
Juncaceae	*Juncus effusus*	L.	Soft Rush	S5	X		
Juncaceae	*Juncus pelocarpus*	E. Mey.	Brown-fruited Rush	S5	X		ACP
Juncaceae	*Juncus secundus*	Beauv. ex Poir.	Secund Rush	S2	X		
Juncaceae	*Juncus tenuis*	Willd.	Path Rush	S5	X		
Cyperaceae	*Carex aquatilis*	Wahlenb.	Water Sedge	S5	X		
Cyperaceae	*Carex aurea*	Nutt.	Golden-fruited Sedge	S5	X		LR
Cyperaceae	*Carex brunnescens*	(Pers.) Poir.	Brownish Sedge	S5	X		
Cyperaceae	*Carex canescens*	L.	Silvery Sedge	S5	X		
Cyperaceae	*Carex crawfordii*	Fern.	Crawford's Sedge	S5	X		
Cyperaceae	*Carex crinita*	Lam.	Fringed Sedge	S5	X		
Cyperaceae	*Carex cryptolepis*	Mackenzie	Small Yellow Sedge	S4	X		
Cyperaceae	*Carex deflexa*	Hornem.	Northern Sedge	S5	X		LR
Cyperaceae	*Carex disperma*	Dewey	Soft-leaved Sedge	S5	X		
Cyperaceae	*Carex echinata*	Murr.	Prickly Sedge	S5	?		
Cyperaceae	*Carex flava*	L.	Yellow Sedge	S5	X		LR
Cyperaceae	*Carex gynandra*	Schwein.	Nodding Sedge	S5	X	X	
Cyperaceae	*Carex hystericina*	Muhl. ex Willd.	Porcupine Sedge	S5	X		LR
Cyperaceae	*Carex intumescens*	Rudge	Bladder Sedge	S5	X		
Cyperaceae	*Carex lacustris*	Willd.	Lake-bank Sedge	S5	X		LR
Cyperaceae	*Carex lasiocarpa*	Ehrh.	Slender Sedge	S5	X		
Cyperaceae	*Carex magellanica*	Lam.	Boreal Bog Sedge	S5	X		
Cyperaceae	*Carex novae-angliae*	Schwein.	New England Sedge	S3	X		
Cyperaceae	*Carex oligosperma*	Michx.	Few-seeded Sedge	S4	X		
Cyperaceae	*Carex pedunculata*	Muhl. ex Willd.	Long-stalked Sedge	S5	X		
Cyperaceae	*Carex scoparia*	Schkuhr ex Willd.	Pointed Broom Sedge	S5	X		
Cyperaceae	*Carex stipata*	Muhl. ex Willd.	Awl-fruited Sedge	S5	X		
Cyperaceae	*Carex stricta*	Lam.	Tussock Sedge	S5	X	X	
Cyperaceae	*Carex trisperma var. billingsii*	Knight	Billing's Three-seeded Sedge	S2S3	X	X	
Cyperaceae	*Carex utriculata*	Boott	Beaked Sedge	S5	X		
Cyperaceae	*Carex vulpinoidea*	Michx.	Fox Sedge	S5	X		
Cyperaceae	*Cladium mariscoides*	(Muhl.) Torr.	Water Bog-rush	S5	X		ACP
Cyperaceae	*Cyperus bipartitus*	Torr.	Umbrella Flatsedge	S5		X	

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Cyperaceae	*Dulichium arundinaceum*	(L.) Britt.	Three-way Sedge	S5	X		
Cyperaceae	*Eleocharis acicularis*	(L.) Roemer & J.A. Schultes	Needle Spike-rush	S5	X		
Cyperaceae	*Eleocharis compressa*	Sullivant	Flat-stemmed Spike-rush	S4	X		
Cyperaceae	*Eleocharis elliptica*	Kunth	Elliptic Spike-rush	S5	X		LR
Cyperaceae	*Eleocharis erythropoda*	Steud.	Bald Spike-rush	S5	X		
Cyperaceae	*Eleocharis ovata*	(Roth) Roemer & J.A. Schultes	Ovate Spike-rush	S5	?		
Cyperaceae	*Eleocharis robbinsii*	Oakes	Robbins' Spike-rush	S4	?		ACP
Cyperaceae	*Eleocharis smallii*	Britt.	Creeping Spike-rush	S5	X		
Cyperaceae	*Eriophorum virginicum*	L.	Tawny Cotton-grass	S5	X		
Cyperaceae	*Fimbristylis autumnalis*	(L.) Roemer & J.A. Schultes	Slender Fimbristylis	S4	X		ACP
Cyperaceae	*Rhynchospora alba*	(L.) Vahl	White Beaked-rush	S5	X	X	
Cyperaceae	*Rhynchospora capitellata*	(Michx.) Vahl	Small-headed Beaked-rush	S4	X		ACP
Cyperaceae	*Rhynchospora fusca*	(L.) Ait. f.	Brown Beaked-rush	S4?	X		ACP
Cyperaceae	*Schoenoplectus acutus*	(Muhl. ex Bigelow) A. & D. Love	Hard-stem Club-rush	S5	X		
Cyperaceae	*Schoenoplectus pungens*	(Vahl) Palla	Three-square	S5	X		
Cyperaceae	*Schoenoplectus tabernaemontani*	(K.C. Gmel.) Palla	Soft-stem Club-rush	S5	X		
Cyperaceae	*Scirpus cyperinus*	(L.) Kunth	Cottongrass Bulrush	S5	X	X	
Poaceae	*Agrostis scabra*	Willd.	Rough Bentgrass	S5	X	X	
Poaceae	*Agrostis stolonifera*	L.	Spreading Bentgrass	S5	X		
Poaceae	*Ammophila breviligulata*	Fern.	American Beachgrass	S3	X	X	
Poaceae	*Avena fatua**	L.	Wild Oat*	SE3	X		
Poaceae	*Brachyelytrum erectum var. glabratum*	(Vasey ex Millsp.) Koyama & Kawano	Northern Shorthusk	S4S5	X	X	
Poaceae	*Bromus inermis ssp. inermis**	Leyss.	Awnless Brome*	SE5	X		INV3
Poaceae	*Calamagrostis canadensis*	(Michx.) Beauv.	Canada Blue-joint	S5	X	X	
Poaceae	*Cinna latifolia*	(Trev. ex Goepp.) Griseb.	Broad-leaved Reed Grass	S5	X		
Poaceae	*Dactylis glomerata**	L.	Orchard Grass*	SE5	X		INV3

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Poaceae	*Danthonia spicata*	(L.) Beauv. ex Roemer & J.A. Schultes	Poverty Oatgrass	S5	X	X	
Poaceae	*Deschampsia flexuosa*	(L.) Trin.	Common Hairgrass	S5	X	X	
Poaceae	*Echinochloa crusgalli**	(L.) Beauv.	Barnyard Grass*	SE5	X		
Poaceae	*Elymus canadensis*	L.	Nodding Wild-rye	S4S5		X	LR
Poaceae	*Elymus hystrix*	L.	Bottlebrush Grass	S5	X	X	
Poaceae	*Festuca occidentalis*	Hook.	Western Fescue	S4?	X		
Poaceae	*Glyceria borealis*	(Nash) Batchelder	Northern Mannagrass	S5	X		
Poaceae	*Glyceria canadensis*	(Michx.) Trin.	Canada Mannagrass	S4S5	X		
Poaceae	*Glyceria melicaria*	(Michx.) F.T. Hubbard	Long Mannagrass	S4	X		LR
Poaceae	*Glyceria striata var. stricta*	(Scribn.) Fern.	Fowl Mannagrass	S4S5	X		
Poaceae	*Hierochloe odorata*	(L.) Beauv.	Sweet Grass	S4	X		LR
Poaceae	*Hordeum jubatum ssp. jubatum**	L.	Squirrel-tail Grass*	SE5	X		
Poaceae	*Leersia oryzoides*	(L.) Sw.	Rice Cutgrass	S5	X		
Poaceae	*Oryzopsis asperifolia*	Michx.	White-grained Mountain-rice	S5	X	X	
Poaceae	*Panicum capillare*	L.	Old Witch Panic Grass	S5	X		
Poaceae	*Phleum pratense**	L.	Timothy*	SE5	X		
Poaceae	*Poa annua**	L.	Annual Bluegrass*	SE5	X		
Poaceae	*Poa compressa**	L.	Canada Bluegrass*	SE5	X	X	
Poaceae	*Poa palustris*	L.	Fowl Bluegrass	S5	X		
Poaceae	*Poa pratensis ssp. pratensis*		Kentucky Bluegrass	S5	X		INV2
Poaceae	*Setaria pumila**	(Poir.) Roemer & J.A. Schultes	Yellow Foxtail*	SE5	?		INV4
Poaceae	*Torreyochloa fernaldii*	(A. Hitchc.) Church	Fernald's Manna Grass	S4	X		
Poaceae	*Zizania palustris*	L.	Northern Wild Rice	S4	X		
Sparganiaceae	*Sparganium americanum*	Nutt.	American Bur-reed	S4?	X		
Sparganiaceae	*Sparganium eurycarpum*	Engelm. ex Gray	Large Bur-reed	S5	X		
Typhaceae	*Typha latifolia*	L.	Broad-leaved Cattail	S5	X	X	
Pontederiaceae	*Pontederia cordata*	L.	Pickerel Weed	S5	X		ACP
Liliaceae	*Allium tricoccum*	Ait.	Wild Leek	S5	X		
Liliaceae	*Clintonia borealis*	(Ait.) Raf.	Bluebead-lily	S5	X	X	
Liliaceae	*Erythronium americanum*	Ker-Gawl.	Yellow Trout-lily	S5	X		
Liliaceae	*Maianthemum canadense*	Desf.	Wild Lily-of-the-valley	S5	X	X	

Liliaceae	*Maianthemum racemosum*	(L.) Link	False Solomon's Seal	S5	X	X	
Liliaceae	*Maianthemum trifolium*	(L.) Sloboda	Three-leaved Solomon's Seal	S5	X		
Liliaceae	*Medeola virginiana*	L.	Indian Cucumber-root	S5	X	X	
Liliaceae	*Polygonatum biflorum*	(Walt.) Ell.	Hairy Solomon's Seal	S4	X		
Liliaceae	*Polygonatum pubescens*	(Willd.) Pursh	Downy Solomon's-seal	S5	X		
Liliaceae	*Streptopus amplexifolius*	(L.) DC.	Clasping-leaved Twisted-stalk	S4S5	X		LR
Liliaceae	*Streptopus lanceolatus*	Michx.	Rose Twisted-stalk	S5	X	X	
Liliaceae	*Trillium erectum*	L.	Purple Trillium	S5	X		
Liliaceae	*Trillium grandiflorum*	(Michx.) Salisb.	White Trillium	S5	X		
Liliaceae	*Trillium undulatum*	Willd.	Painted Trillium	S5?	X		
Iridaceae	*Iris versicolor*	L.	Blueflag	S5	X		
Orchidaceae	*Calopogon tuberosus*	(L.) B.S.P.	Grass Pink	S4S5	X	X	
Orchidaceae	*Corallorhiza maculata*	(Raf.) Raf.	Spotted Coral-root	S5	X	X	
Orchidaceae	*Cypripedium acaule*	Ait.	Pink Lady's-slipper	S5	X	X	
Orchidaceae	*Epipactis helleborine**	(L.) Crantz	Common Helleborine*	SE5	X		
Orchidaceae	*Goodyera oblongifolia*	Raf.	Giant Rattlesnake-plantain	S4	X		
Orchidaceae	*Goodyera pubescens*	(Willd.) R. Br. ex Ait. f.	Downy Rattlesnake-plantain	S4	X		
Orchidaceae	*Goodyera repens*	(L.) R. Br. ex Ait. f.	Dwarf Rattlesnake-plantain	S5	X		LR
Orchidaceae	*Goodyera tesselata*	Lodd.	Checkered Rattlesnake-plantain	S4S5	X		
Orchidaceae	*Liparis loeselii*	(L.) L.C. Rich.	Fen Twayblade	S4S5	X		LR
Orchidaceae	*Listera australis*	Lindl.	Southern Twayblade	S1	X		ACP
Orchidaceae	*Listera cordata*	(L.) R. Br. ex Ait. f.	Heartleaf Twayblade	S5?	X		
Orchidaceae	*Malaxis unifolia*	Michx.	Green Adder's-mouth	S4S5	X		
Orchidaceae	*Platanthera clavellata*	(Michx.) Luer	Club Spur Orchid	S4S5	X	X	
Orchidaceae	*Platanthera macrophylla*	P.M. Brown	Large Round-leaved Orchid	S2			NHIC
Orchidaceae	*Platanthera orbiculata*	(Pursh) Lindl.	Small Round-leaved Orchid	S4S5	X		LR
Orchidaceae	*Pogonia ophioglossoides*	(L.) Ker-Gawl.	Rose Pogonia	S4S5	X	X	
Orchidaceae	*Spiranthes cernua*	(L.) L.C. Rich.	Nodding Ladies'-tresses	S5	X	X	
Orchidaceae	*Spiranthes lacera var. lacera*	Rafinesque	Northern Ladies'-tresses	S4S5	X		
Orchidaceae	*Spiranthes romanzoffiana*	Cham.	Hooded Ladies'-tresses	S5	X		
Orchidaceae	*Spiranthes X simpsonii*	Catling & Sheviak	Hybrid Ladies' Tresses	S1	X		
			Totals =>		**424**	**121**	

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